

Appl. No. 09/692,420  
Amdt. dated Oct. 5, 2005  
Reply to Office action of May 5, 2005

### REMARKS

Claims 1-81 are pending in the present application. The Examiner has rejected claims 1-61 and 75-81 and has allowed claims 62-74.

#### I. ALLOWED CLAIMS 62-74

Applicants gratefully acknowledge the indication by the Examiner that claims 62-74 have been allowed.

#### II. REJECTION OF CLAIMS 1-61 and 75-81 UNDER 35 U.S.C. § 103(a)

Claims 1-61 and 75-81 stand rejected under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 5,828,589 ("Degenhardt") in view of United States Patent No. 6,542,722 B1 ("Sorrells") and further in view of United States Patent No. 5,451,852 ("Gusakov"). Applicants respectfully traverse the rejection.

#### Claims 1-22

Claim 1 recites "a plurality of cascaded filters; and a bypass circuit coupled across one of the cascaded filters".

The Office Action at page 2 states that support for a plurality of cascaded filters can be found at col. 2, lines 9-44; col. 7, line 22-col. 8, line 54 of Degenhardt. Applicants respectfully request that the Examiner specifically point out a plurality of cascaded filters in Degenhardt instead of Applicants hazarding a guess. Reference to a particular component in a particular figure would be most helpful.

Referring to the cited text in the Degenhardt, it appears that the Examiner may be alleging that adaptive filter 5 and main filter 15 constitute a plurality of cascaded filters. Applicants can only confirm that Degenhardt refers to adaptive filter 5 and main filter 15 as

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filters. Applicants neither affirm nor deny that adaptive filter 5 and main filter 15 are cascaded filters since such a characterization has no bearing on the arguments as set forth below.

#### Understanding Degenhardt

In analyzing the obviousness rejection, Applicants respectfully note that invention taught in Degenhardt is being modified by the inventions taught by Sorrells and Gusakov. Thus, the Examiner cannot stray from the underpinning of the obviousness rejection that the Examiner is modifying the self-adaptive trans-hybrid balance filter taught by Degenhardt. See, e.g., the title of Degenhardt. The fundamental structure of the self-adaptive trans-hybrid balance filter is shown in a block circuit diagram in FIG. 1 of Degenhardt. As can be understood from FIG. 1, the self-adaptive trans-hybrid balance filter includes adaptive filter 5 and main filter 15.

As described in, for example, col. 1, lines 38-51 and 61-67, Degenhardt generally teaches that between two line subscribers (e.g., speakers) A and B, wherein A and B are used here for clarification. Subscribers A and B use local telephones that are connected to telephone service via a local two-wire twisted line connection. Each local two-wire line is connected to a four-wire line of the public switched telephone network. The connection between the two-wire line and the four-wire line is facilitated with a hybrid (i.e., a bridge circuit). Thus, subscriber A is connected to the four-wire line via Hybrid A and subscriber B is connected to the four-wire line via Hybrid B. Due to impedance mismatches between a two-wire line and a four-wire line, echoes (i.e., reflections) are generated at the hybrid. When subscriber A speaks, there is an echo created at Hybrid B which can be quite annoying. When subscriber B speaks, there is an echo created at Hybrid A.

As generally taught in Degenhardt, the self-adaptive trans-hybrid balance filter shown in FIG. 1 attempts to analyze the speech signal of subscriber A on transmission path 7 using adaptive filter 5. The transmission path 7 is a path carrying, for example, the speech signal of subscriber A to subscriber B. The adaptive filter 5 generates filter coefficients based on the speech signal of subscriber A. The filter coefficients are used to generate a signal that estimates the echo (i.e., the echo created at Hybrid B) that will be present on the reception path 14. The reception path 14 is a path carrying, for example, (1) the speech signal of subscriber B to subscriber A and (2) the echo signal based on the speech signal of subscriber A that was

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reflected at Hybrid B. The main filter 15 generates an estimated echo signal (e.g., the output of main filter 15) that can approximately cancel (e.g., see subtractor 16) the echo signal based on the speech signal of subscriber A that was reflected at Hybrid B and is carried by the reception path 14. Thus, the output of subtractor 16 is ideally just the speech signal of subscriber B without the echo based on the speech signal of subscriber A.

### Conclusion

As a courtesy to the Examiner, Applicants have painstakingly explained the self-adaptive trans-hybrid balance filter as illustrated in FIG. 1 of Degenhardt so as to point out that the Examiner *cannot bypass* the self-adaptive trans-hybrid balance filter or its components such as, for example, adaptive filter 5 and main filter 15.

The Examiner has already admitted that "Degenhardt does not specifically disclose the feature of a bypass circuit coupled across one of the cascaded filters." Office Action at page 2, section 2. Furthermore, Degenhardt refers to the block circuit diagram of FIG. 1 as illustrating "fundamental structure". See, e.g., col. 4, lines 55-47. Fundamental structure implies that all the elements need to be present to practice the Degenhardt invention.

Applicants respectfully submit that there can be no dispute that the purpose of the self-adaptive trans-hybrid balance filter is to adaptively cancel out echo at subtractor 16. The Examiner cannot bypass the self-adaptive trans-hybrid balance filter, adaptive filter 5 or main filter 15 without destroying the purpose of Degenhardt which is to adaptively cancel out echo at subtractor 16. It is at the core of the invention of Degenhardt that adaptive filter 5 and main filter 15 work together to provide the self-adaptive trans-hybrid balance filter.

If the Examiner bypasses the self-adaptive trans-hybrid balance filter then there is no echo cancellation and Degenhardt has been completely gutted of its teachings.

If the Examiner bypasses main filter 15, then the self-adaptive trans-hybrid balance filter cannot generate an estimated echo cancellation signal. Without the estimated echo cancellation signal, there can be no echo signal cancellation at subtractor 16.

If the Examiner bypasses adaptive filter 5, then there can be no adapting filter coefficients based on the speech signal of subscriber A. Without adaptive filter coefficients, Degenhardt can no longer principally function as a "self-adaptive" trans-hybrid balance filter.

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Furthermore, since the adaptive filter coefficients are used to accurately generate an echo cancellation signal, the self-adaptive trans-hybrid balance filter would no longer be effective in canceling echo (e.g., the echo of speech signals of subscriber A which were reflected at Hybrid B) carried by the reception path 14.

Modifying Degenhardt as suggested by the Examiner would change the core principle of operation of Degenhardt which is prohibited by M.P.E.P. § 2143.01 ("the proposed modification cannot change the principle of operation of a reference").

Furthermore, modifying Degenhardt as suggested by the Examiner would render Degenhardt unsatisfactory for its intended purpose which is also prohibited by M.P.E.P. § 2143.01 ("the proposed modification cannot render the prior art unsatisfactory for its intended purpose").

For at least the above reasons, Applicants respectfully submit that the obviousness rejection cannot be maintained based on the modification of Degenhardt as alleged by the Examiner.

It is therefore respectfully requested that the obviousness rejection be withdrawn with respect to claim 1 and its dependent claims (i.e., claims 2-22).

#### Claims 23-43

Claim 23 recites "a plurality of cascaded filters; and bypass means for bypassing at least one of the cascaded filters".

The same or similar arguments, if appropriate, made with respect to claim 1 are also made herein with respect to claim 23.

For at least the above reasons, Applicants respectfully submit that the obviousness rejection cannot be maintained based on the modification of Degenhardt as alleged by the Examiner.

It is therefore respectfully requested that the obviousness rejection be withdrawn with respect to claim 23 and its dependent claims (i.e., claims 24-43).

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**Claims 44-61**

**Polyphase Filter**

Claim 44 recites a polyphase filter coupled to a biquad filter.

Applicants respectfully submit that, in support of the obviousness rejection, the Examiner has cited three patent documents to show a polyphase filter coupled to a biquad filter. Applicants respectfully submit even these three patent documents do not teach at least a polyphase filter and, in particular, a polyphase filter coupled to a biquad filter.

In support of the rejection, the Examiner alleges that these elements are met by the combination of:

- (1) Degenhardt at FIGS. 1-2; col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54;
- (2) Sorrells at FIG. 49 and col. 54, lines 24-60; and
- (3) Gusakov at col. 2, lines 4-60; col. 4, lines 4-63; and col. 5, lines 12-66.

Applicants respectfully disagree. Applicants have carefully perused the drawings and text cited by the Examiner and can find no reference to a polyphase filter or to a polyphase filter coupled to a biquad filter.

*In fact, neither Degenhardt nor Sorrells nor Gusakov even mentions a polyphase filter.* Applicants respectfully submit that Degenhardt, Sorrells and Gusakov, individually or combined, do not teach a polyphase filter and, in particular, a polyphase filter coupled to a biquad filter. Since the combined references do not even mention a polyphase filter, Applicants respectfully submit that the rejection cannot be maintained. It is therefore respectfully requested that the rejection be withdrawn with respect to claim 44 and its dependent claims (i.e., claims 45-61).

*If the Examiner intends to maintain the rejection of claims 44-61 over Degenhardt in view of Sorrells and further in view of Gusakov, then it should be a simple matter of pointing out a polyphase filter in FIG. 1 or FIG. 2 of Degenhardt or a polyphase filter in FIG. 49 of Sorrells or a polyphase filter in Gusakov that is specifically taught to be a polyphase filter or is specifically taught to be a polyphase filter coupled to a biquad filter.*

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After the Examiner has identified which of the above-identified filters is a polyphase filter and after the Examiner has provided supported from the cited patent documents, Applicants respectfully request that the Examiner demonstrate how they are coupled.

Applicants have carefully reviewed the figures and text cited by the Examiner and respectfully submit that neither Degenhardt nor Sorrells nor Gusakov describes or teaches a polyphase filter coupled to a biquad filter.

It is therefore respectfully requested that the rejection be withdrawn with respect to claim 44 and its dependent claims 45-61.

#### Additional Arguments

Furthermore, kindly consider the following arguments which add to the totality of evidence that the dependent claims recite subject matter that is patentable over the three cited patent documents.

#### Biquad Filters Intertwined with Polyphase Filters

With respect to claim 45, the Examiner alleges that, of the three cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches biquad filters intertwined with polyphase filters. Applicants respectfully submit that neither Degenhardt nor Sorrells nor Gusakov teaches biquad filters *intertwined* with polyphase filters. Applicants also respectfully remind the Examiner none of the cited patent documents even mentions polyphase filters. For at least the above reasons, the rejection with respect to claim 45 is respectfully traversed.

#### Feedback Resistor and Feedback Capacitor

With respect to claims 50 and 11, the Examiner alleges that, of the three cited patent documents, Degenhardt at col. 7, line 22 to col. 8, line 54 teaches biquad filters in which "each comprises first and second amplifiers each having a feedback loop comprising a feedback resistor and feedback capacitor coupled in parallel." *Degenhardt does not even mention a resistor or a capacitor. Degenhardt does not teach this level of detail.* Accordingly, as alleged,

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Degenhardt does not teach the elements as set forth in claim 50 and the rejection with respect to claims 50 and 11 is respectfully traversed.

#### Programmable Feedback Resistor

With respect to claims 51 and 12, the Examiner alleges that, of the three cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches a filter circuit in which "at least one of the feedback resistors is programmable". As argued with respect to claim 50, *Degenhardt does not even mention a resistor. Degenhardt does not teach this level of detail.* Of course, if Degenhardt does not even mention a resistor, Degenhardt certainly does not teach a programmable resistor. Degenhardt is silent as to a programmable resistor. Thus, the rejection of claims 51 and 12 is respectfully traversed.

#### Programmable Capacitor

With respect to claims 53 and 14, the Examiner alleges that, of the three cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches a filter circuit in which "at least one of the feedback capacitors is programmable". As argued with respect to claim 50, *Degenhardt does not even mention a capacitor. Degenhardt does not teach this level of detail.* Of course, if Degenhardt does not even mention a capacitor (which Applicants challenge), Degenhardt certainly does not teach a programmable capacitor. Degenhardt is silent as to a programmable capacitor. Thus, the rejection of claims 53 and 14 is respectfully traversed.

#### Cross Coupled Resistor

With respect to claims 55 and 12, the Examiner alleges that, of the three cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches "a first cross coupled resistor coupled between an output of the first amplifier and an input of the second amplifier, and a second cross coupled resistor coupled between an output of the second amplifier and an input of the first amplifier". However, *Degenhardt does not even mention a resistor. Degenhardt does not teach this level of detail.* If Degenhardt does not teach a resistor, then Degenhardt does not teach a cross coupled resistor between an output of a first amplifier and an

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input of a second amplifier. If Degenhardt does not teach a resistor, then Degenhardt does not teach a cross coupled resistor between an output of a second amplifier and an input of a first amplifier. Thus, the rejection of claims 54 and 12 is respectfully traversed.

#### Degenhardt Does Not Teach Alleged Details

Applicants respectfully reiterate that the Examiner has overextended the teachings of Degenhardt in the combined references. The Examiner has stated that Degenhardt teaches a multitude of details in the ubiquitous col. 2, lines 9-44 and col. 7, line 22 to col. 8, line 54. However, Degenhardt does not teach any of the above-identified details and, in many cases, does not even mention the alleged element. *Applicants respectfully remind the Examiner that the references must teach each and every element of each and every claim.* It is respectfully submitted that the Office Action does not accomplish this by merely relying, over and over again, on col. 2, lines 9-44 and col. 7, line 22 to col. 8, line 54 of Degenhardt, which clearly does not teach the detailed elements and relationships between the elements as set forth in the claims.

#### Claims 75-81

With respect to claim 75, none of the cited text or figures of the three patent documents cited in the Office Action teaches rejecting an image of the signal in the selected channel. In fact, none of the three patent documents even mentions an image. Furthermore, the Examiner admits that Degenhardt does not teach at least the following: applying gain to the signal, the applied gain being programmable. Neither Sorrells nor Gusakov make up for the *admitted* teaching deficiencies of Degenhardt. For at least the above reasons, Applicants respectfully request that the rejection be withdrawn with respect to claim 75 and its dependent claims (i.e., claims 76-81).

Claim 78 recites "*introducing a zero to filter a frequency* in the selected channel different from a frequency of the signal" (italics added for emphasis). Claim 79 recites "*introducing a plurality of zeros each filtering* a different frequency in the selected channel" (italics added for emphasis). In addition, claim 81 recites "*programming an order* of complex filtering" (italics

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added for emphasis). None of the cited three patent documents teach at least these elements. For at least the above reasons, the rejection of claims 78, 79 and 81 is respectfully traversed.

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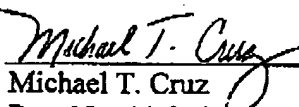
**III. CONCLUSION**

In view of at least the foregoing, it is respectfully submitted that the pending claims 1-81 are in condition for allowance. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the below-listed telephone number.

The Commissioner is hereby authorized to charge additional fees or credit overpayments to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: October 5, 2005

Respectfully submitted,

  
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